

## IN THE CLAIMS

1. (Canceled)

2. (Canceled)

3. (Currently amended) ~~The method of claim 2 further comprising:~~

A method for determining a gradient magnitude image from a range image, the range image including a plurality of intensity values at pixel locations, comprising:

determining, for each pixel (i,j), a horizontal central difference  $dx$ , and a vertical central difference  $dy$ ;

setting a 2D gradient magnitude at each pixel (i,j) in a gradient magnitude image  $I_{GM}$  to  $0.5 * \sqrt{dx^2 + dy^2 + 4}$ ;

scaling the range image to produce a scaled range image where a unit intensity value at each pixel corresponds to a unit distance value;

selecting a 3D point  $\mathbf{p}$ ; and further comprising:

determining a magnitude of a gradient at point  $\mathbf{p}$  from the scaled range image and the gradient magnitude image  $I_{GM}$  comprising:

perpendicularly projecting point  $\mathbf{p}$  onto the scaled range image to determine a location (x,y);

interpolating a gradient magnitude at the location (x,y) from the corresponding 2D gradient magnitude image values near the location (x,y); and

setting the magnitude of the gradient at point  $\mathbf{p}$  to the interpolated gradient magnitude at location (x,y).

4. (Currently amended) ~~The method of claim 2 for determining a corrected projected distance at a 3D point  $\mathbf{p}$  further comprising:~~

A method for determining a gradient magnitude image from a range image, the range image including a plurality of intensity values at pixel locations, comprising:

determining, for each pixel  $(i,j)$ , a horizontal central difference  $dx$ , and a vertical central difference  $dy$ ;

setting a 2D gradient magnitude at each pixel  $(i,j)$  in a gradient magnitude image  $I_{GM}$  to  $0.5 * \sqrt{dx^2 + dy^2 + 4}$ ;

scaling the range image to produce a scaled range image where a unit intensity value at each pixel corresponds to a unit distance value; and further comprising:

determining a projected distance at point  $\mathbf{p}$  from the scaled range image;

determining a magnitude of a gradient at  $\mathbf{p}$  from the scaled range image and the gradient magnitude image  $I_{GM}$  comprising:

perpendicularly projecting point  $\mathbf{p}$  onto the scaled range image to determine a location  $(x,y)$ ;

interpolating a gradient magnitude at the location  $(x,y)$  from the corresponding 2D gradient magnitude image values near the location  $(x,y)$ ; and

setting the magnitude of the gradient at the point  $\mathbf{p}$  to the interpolated gradient magnitude at the location  $(x,y)$ ; and

setting the corrected projected distance at point  $\mathbf{p}$  to the projected distance at point  $\mathbf{p}$  divided by the magnitude of the gradient at point  $\mathbf{p}$ .